



Oregon

Kate Brown, Governor

Water Resources Department

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January 26, 2017

Hudspeth Family LTD Partnership
Attn: Brian Barney
PO Box 478
Prineville, OR 97754

Re: Barnes Butte Dam (B-38) – Inspection Summary

This dam was inspected on October 13, 2016. I performed the inspection with Dam Safety Engineer, Tony Janicek. Brian Barney was also there for the inspection. The Water Resources Department conducts routine inspections of the dam's exterior surfaces to identify conditions that might affect the safety of the dam. Dams are assigned a hazard rating based on downstream hazard to people and property, not on the condition of the dam. Barnes Butte is classified as a high hazard dam and is inspected annually.

Summary: The dam is reasonably maintained and operated and in fair condition for all elements but flood capacity, which is still under review, and is a major unknown issue. The valve was just returned to operable condition and was cycled during this inspection.

The results of this inspection are illustrated and described in the following photos and text. This inspection includes recommendations to keep the dam safe and functional.

Results of Inspection:



Minimum freeboard as measured in the last inspection was between 3.3 and 3.5 feet, which is insufficient. The crest has decreased over time, with low spots, due to settlement of the dam, cattle trampling, and possibly vehicle use. The now reduced height of the dam also reduces the freeboard (distance between the water level and the top of the dam). This increases the risk of overtopping during significant storm events, and reduces the capacity of the emergency spillway to pass flood flows during significant storm events, since water depth in the spillway is reduced by the amount of freeboard loss.



Operation of valve

The valve was operated for the first time since some time prior to my 2011 inspection. An operational valve is essential for maintenance of the dam. It is also necessary in an emergency, where the reservoir needs to be lowered quickly. It is now important to cycle this valve on an annual basis. Cycling means completely opening the valve and then closing it. Valves that are not cycled will eventually stick and become inoperable. A working low-level conduit, which relies on this valve, is critical to the safety of this dam.



Spillway approach and control section

During our inspection, we took rough measurements of the spillway and dam crest in order to approximate the reduction in spillway capacity due to the low spots on the crest. The calculations indicate that the spillway capacity has been reduced by more than 20% from the designed condition. It should be noted that the calculations were based off of rough field measurements and as such represent an approximation of the reduced spillway capacity. Although we are certain that there is a reduction in spillway capacity because of the low spots on the crest, the actual magnitude of the reduction can only be determined through a detailed survey of the dam crest and an engineering analysis.



As previously stated, this embankment has become lower over time through a combination of settlement, trampling, and vehicle traffic. Other than having a lower crest and reduced flood capacity, there is no other evidence of problems with the embankment.



Outlet of low-level conduit

We observed increased flow through this conduit as the valve was opened, so it appears to function correctly. The steep pipe appears to be in reasonable condition. The area around the conduit, and the overall toe of the dam, are covered with brush, so seepage flows could not be evaluated.

Critical Issues Soon:

1. Inspect the dam if there is an intense rainstorm at the site, especially if this occurs when there is snow on the ground. Utilize the EAP to determine if further action is needed. **This could happen in the next few months.**
2. Replace lost fill on the crest of the dam. By our approximate calculations this is up to two feet of depth at the lowest spots on the crest. This should occur during relatively dry periods when equipment can easily operate on the dam.

We use a standard inspection form, and a copy of the field inspection sheet for this dam is attached. Thanks again to Brian Barney for meeting with us at the dam, and for his diligent work to restore the valve to operational status. We plan to conduct a high runoff inspection this spring, and look forward to meeting the new owners or meeting whoever is responsible for dam operations at that time. Please let me know if you have any questions about this inspection.

Sincerely,

Keith Mills, P.E., State Engineer
(503) 986-0840
Cell (541) 706-0849

C: Jeremy Giffin, Watermaster District 11
Dam Safety File B-38

IV. Conduit		Control: <input checked="" type="checkbox"/> Manual <input type="checkbox"/> Power <input type="checkbox"/> Other <input type="checkbox"/> Conduit Control missing	Rating
Inlet gate	<input checked="" type="checkbox"/> Submerged		—
Trash Rack	<input checked="" type="checkbox"/> Submerged		—
Control/Stem	<input checked="" type="checkbox"/> Clean <input type="checkbox"/> Greased <input type="checkbox"/> Irregular SECURED		4
Valve(s) cycling	<input type="checkbox"/> Frozen <input type="checkbox"/> unknown <input type="checkbox"/> past year <input checked="" type="checkbox"/> frequent		4
Diameter:	Material _____ Condition _____		—
Outlet Structure	<input checked="" type="checkbox"/> Overgrown <input type="checkbox"/> Clean <input type="checkbox"/> Pressurized <input type="checkbox"/> Leaking _____ gpm		4
Secondary outlet	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Type _____ Diameter _____ in.		—
Comments:	• GATE/STEM/CONTROLS REPAIRED w/IN LAST YR OR 2 CONTROL OPENS COUNTER CLOCKWISE / CLOSSES CLOCKWISE		

V. Spillway		<input checked="" type="checkbox"/> Earth <input type="checkbox"/> Rock <input type="checkbox"/> Concrete <input type="checkbox"/> Other	Rating
Modifications	<input checked="" type="checkbox"/> None <input type="checkbox"/> Reduction in capacity <input type="checkbox"/> Feature not on design		—
Approach Channel	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Trees/brush <input type="checkbox"/> debris <input type="checkbox"/> erosion		4
Control Section	Width _____ Depth _____ <input type="checkbox"/> Concrete <input type="checkbox"/> Rock <input type="checkbox"/> Soil <input type="checkbox"/> Culvert <input type="checkbox"/> Unstable		4
Flashboards/Gate	<input checked="" type="checkbox"/> None <input type="checkbox"/> In place <input type="checkbox"/> operational <input type="checkbox"/> deteriorated		—
Discharge Channel	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Trees/brush <input type="checkbox"/> leakage <input type="checkbox"/> headcutting (_____ feet approaching control section, depth _____ feet.)		4-
Stilling basin	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Functional <input type="checkbox"/> Minor Erosion <input type="checkbox"/> Severe Erosion/Undercutting		—
Aux. Spillway	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (use comments below)		—
Comments:	• WATER FLOWING OVER SPILLWAY • UNKNOWN IF CAPACITY IS SUFFICIENT TO PASS SIG. FLOOD PLUMB - NEED ANALYSIS		

VI. Access and Security		Rating
Vehicle access	<input type="checkbox"/> Public road <input type="checkbox"/> all weather road <input checked="" type="checkbox"/> dirt road <input type="checkbox"/> cross country	4
Fencing, signage	<input type="checkbox"/> Remote <input checked="" type="checkbox"/> Gates <input type="checkbox"/> Secure Fence <input type="checkbox"/> Camera <input type="checkbox"/> Uncontrolled	4
New Structure below dam	Dwelling _____ feet Paved public road _____ feet Other sig building _____ feet	—
Emergency Action Plan	<input type="checkbox"/> Not required <input type="checkbox"/> Completed _____ at dam (dated _____) <input type="checkbox"/> None	?
Comments:		

Instrumentation data reviewed: ☐ N/A ☐ Yes ☐ No

Other:

